

# SEQUENCE LISTING

<110> E. I. du Pont de Nemours and Company

<120> Plant Histidine Biosynthetic Enzymes

<130> BB1255

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<141>

<150> 60/105,409

<151> 1998-10-23

<160> 22

<170> Microsoft Office 97

<210> 1

<211> 433

<212> DNA

<213> Zea mays

<220>

<221> unsure

<222> (432)

<400> 1

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tgaaaggctg acaaaaacttg tcgagctggt tgggaaacag aggcttgtgc tggaccttaa 300
gctgtcgaaa aaaggatggc aagatatact attgtaactg acaggtggca aaagttcagt 360
gatgtgtttg tggatgaacc ggcattagaa tatctcgcgt cctttcgcag attagttttt 420
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<210> 2

<211> 74

<212> PRT

<213> Zea mays

<400> 2

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          20              25              30
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Lys Gln Arg Leu Val Leu Asp Leu Lys Leu Ser Lys Lys Ala Arg Tyr
          35              40              45
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Thr Ile Val Thr Asp Arg Trp Gln Lys Phe Ser Asp Val Phe Val Asp
          50              55              60
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<210> 3

<211> 490

<212> DNA  
<213> Zea mays

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taaagaaagc aggcaaaagt cgggtagatg taacaattgg gagtgctcta gatataattg 180  
gaggagattt gccttacaaa gatgttgccc tttggcacag gaagcaaaagt atggttgggc 240  
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cacaaagtat nttttctgaa catttttggt caaataattc aagttaggct atctccaaca 360  
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tttggggntt 490

<210> 4  
<211> 76  
<212> PRT  
<213> Zea mays

<400> 4  
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Pro Ile Pro Val Thr Tyr Ala Gly Gly Val Ser Thr Met Asp Asp Leu  
20 25 30  
Glu Arg Ile Lys Lys Ala Gly Lys Ser Arg Val Asp Val Thr Ile Gly  
35 40 45  
Ser Ala Leu Asp Ile Phe Gly Gly Asp Leu Pro Tyr Lys Asp Val Val  
50 55 60

Leu Trp His Arg Lys Gln Ser Met Val Gly Gln Val  
65 70 75

<210> 5  
<211> 466  
<212> DNA  
<213> Zea mays

<400> 5  
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ccagggtcag atcagcagct cttgccttat cccgctggct ggccgcagca ccggtggtgt 180  
ggtggaggat ggcacgcgaa tacgtggcca gggtaaccgt tccatgggtg gcgccacaac 240  
gtcgttttgt tggttcatgg gtttccgtct gtcggtaaaa atgcggtgca ttgggaggac 300  
ggatgttgtg tgcgctgctg ttagcttcag accatgcacg gacattcaca aggggaaagt 360  
taagcagatt gttggttcta ctcttcggga ttcattcaat gatggcatgg aacttgtgac 420  
aaactttgaa tcagacaaat ctctgcaga atttgcaaaa tcatat 466

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<211> 81  
<212> PRT  
<213> Zea mays

<400> 6  
Met Val Gly Ala Thr Ser Phe Gly Trp Phe Met Gly Phe Arg Leu  
1 5 10 15

Leu Gly Lys Met Arg Cys Ile Gly Arg Thr Asp Val Val Cys Ala Ala  
20 25 30

Val Ser Phe Arg Pro Cys Ile Asp Ile His Lys Gly Lys Val Lys Gln  
35 40 45

Ile Val Gly Ser Thr Leu Arg Asp Ser Ser Asn Asp Gly Met Glu Leu  
50 55 60

Val Thr Asn Phe Glu Ser Asp Lys Ser Pro Ala Glu Phe Ala Lys Ser  
65 70 75 80

Tyr

<210> 7  
<211> 566  
<212> DNA  
<213> Zea mays

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agatgagttt ttggttcatt gtgttgatgt ggagggcaca aggttaggaa ttgatgagga 180  
acttgtggaa ctattggggc actattcacc aatcccagtc acttatgctg ggggtgtgtc 240  
aacaatggac gacctagaga ggataaagaa agcaggcaaa agtcgggtag atgtaacaat 300  
tgaggagtgc ctatagataa ttggangaga ttgccttaac aagatgttgt ccttggcacc 360  
agggagccaa gtaatggttg ggncaagtgt gaagaacncc aggggaattaa tccagtanta 420  
cccagttcca ttgatnaaa ccnctggac caaaagataa tttccccgaa ccaatttttg 480  
gtccnaanaa atccaggtaa ggggaatttc ccaaanaaag anccccctaa cccaaccnc 540  
cccaatttcc naaaaccaa attttc 566

<210> 8  
<211> 108  
<212> PRT  
<213> Zea mays

<400> 8  
Val Leu Asp Leu Ser Cys Arg Lys Lys Asp Gly Arg Tyr Thr Ile Val  
1 5 10 15

Thr Asp Arg Trp Gln Lys Phe Ser Asp Val Phe Val Asp Glu Pro Thr  
                   20                  25                  30  
 Leu Glu Tyr Leu Ala Ala Phe Ala Asp Glu Phe Leu Val His Gly Val  
                   35                  40                  45  
 Asp Val Glu Gly Lys Arg Leu Gly Ile Asp Glu Glu Leu Val Glu Leu  
                   50                  55                  60  
 Leu Gly His Tyr Ser Pro Ile Pro Val Thr Tyr Ala Gly Gly Val Ser  
                   65                  70                  75                  80  
 Thr Met Asp Asp Leu Glu Arg Ile Lys Lys Ala Gly Lys Ser Arg Val  
                   85                  90                  95  
 Asp Val Thr Ile Gly Ser Ala Leu Asp Ile Ile Gly  
                   100                  105

<210> 9  
 <211> 397  
 <212> DNA  
 <213> Zea mays

<400> 9  
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 atggaacttg tgacaaactt tgaatcagac aaatctcctg cagaatttgc aaaatcatat 120  
 aaagaagatg aacttcttgaggacatggt ataatgcttg gctcagatcc tgcaagccag 180  
 gctgctgcac tcgaggcact acatgcatat cctgggtggct tgcaagttgg aggtggaata 240  
 aatttgcaga atgcaatgtc ttaccttaat gaaggggcca gtcattgtgat agtgacctct 300  
 tatgtgttta gcgatggcaa gatgaacatt gaaaggctga caaaacttgt cgagctgggt 360  
 gggaaacaga gcttgtgctg gaccttagct gtcgaaa 397

<210> 10  
 <211> 130  
 <212> PRT  
 <213> Zea mays

<400> 10  
 His Lys Gly Lys Val Lys Gln Ile Val Gly Ser Thr Leu Arg Asp Ser  
   1                  5                  10                  15  
 Ser Asn Asp Gly Met Glu Leu Val Thr Asn Phe Glu Ser Asp Lys Ser  
                   20                  25                  30  
 Pro Ala Glu Phe Ala Lys Ser Tyr Lys Glu Asp Glu Leu Leu Gly Gly  
                   35                  40                  45  
 His Val Ile Met Leu Gly Ser Asp Pro Ala Ser Gln Ala Ala Ala Leu  
                   50                  55                  60  
 Glu Ala Leu His Ala Tyr Pro Gly Gly Leu Gln Val Gly Gly Gly Ile  
                   65                  70                  75                  80  
 Asn Leu Gln Asn Ala Met Ser Tyr Leu Asn Glu Gly Ala Ser His Val  
                   85                  90                  95  
 Ile Val Thr Ser Tyr Val Phe Ser Asp Gly Lys Met Asn Ile Glu Arg  
                   100                  105                  110  
 Leu Thr Lys Leu Val Glu Leu Val Gly Lys Gln Ser Leu Cys Trp Thr

Leu Ala  
130

<210> 11  
<211> 423  
<212> DNA  
<213> Zea mays

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tcagacaaat ctctgcaga atttgctaaa ttttataaag cagatgaact tctaggagga 180  
catgttataa tgcttggcgc aaatccttca agccaggctg ctgcactgga ggcactacgt 240  
gcatatcctg gtggtttgca agttggagggt gggataaatt tggagaatgc aatgncttac 300  
cttaatgaag gggccagaca tgtgatagtg acctcttatg tggttaggga tggcaagatg 360  
aacactgaaa ggntaanaaa acttgncgag ctgnntggga aacagaggct tcgtgctgga 420  
cct 423

<210> 12  
<211> 135  
<212> PRT  
<213> Zea mays

<220>  
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<220>  
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<222> (123)..(124)

<220>  
<221> UNSURE  
<222> (127)

<220>  
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<400> 12  
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1 5 10 15  
Gln Ile Val Gly Ser Thr Leu Arg Asp Leu Ala Xaa Asp Ser Met Glu  
20 25 30  
Leu Val Thr Asn Phe Glu Ser Asp Lys Ser Pro Ala Glu Phe Ala Lys  
35 40 45  
Phe Tyr Lys Ala Asp Glu Leu Leu Gly Gly His Val Ile Met Leu Gly  
50 55 60  
Ala Asn Pro Ser Ser Gln Ala Ala Ala Leu Glu Ala Leu Arg Ala Tyr  
65 70 75 80  
Pro Gly Gly Leu Gln Val Gly Gly Gly Ile Asn Leu Glu Asn Ala Met  
85 90 95  
Xaa Tyr Leu Asn Glu Gly Ala Arg His Val Ile Val Thr Ser Tyr Val  
100 105 110  
Val Arg Asp Gly Lys Met Asn Thr Glu Arg Xaa Xaa Lys Leu Xaa Glu  
115 120 125  
Leu Xaa Gly Lys Gln Arg Leu  
130 135

<210> 13  
<211> 535  
<212> DNA

<213> Zea mays

<220>

<221> unsure

<222> (442)

<220>

<221> unsure

<222> (459)

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<221> unsure

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<220>

<221> unsure

<222> (519)

<400> 13

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ctcgaggcac	tacatgcata	tcctgggtggc	ttgcaagttg	gaggtggaat	aaatttgcag	180
aatgcaatgt	cttaccttag	ctgtcgaaaa	aaggatggca	gatatactat	tgtaactgac	240
aggtggcaga	agttcagtga	tgtgtttgtg	gatgaaccgg	cattaggata	tctcgctgcc	300
ttcgcagatg	agtttttggt	tcatgggtgtt	gatgtggagg	gcaaaagggt	agggattgat	360
gaggaacttg	tggaactatt	ggggcatcat	tcaccaatcc	cagtaactta	tgctgggggt	420
gtgtcaacaa	tggatgacct	anagaggata	aagaagcang	caaaagtcga	gtanatgtaa	480
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<210> 14

<211> 177

<212> PRT

<213> Zea mays

<220>

<221> UNSURE

<222> (148)

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<221> UNSURE

<222> (152)

<220>

<221> UNSURE

<222> (154)

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<222> (159)

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<221> UNSURE

<222> (167)

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<221> UNSURE



<222> (174)

<400> 14

Val Thr Asn Phe Glu Ser Asp Lys Ser Pro Ala Glu Phe Ala Lys Ser  
1 5 10 15  
Tyr Lys Glu Asp Glu Leu Leu Gly Gly His Val Ile Met Leu Gly Ser  
20 25 30  
Asp Pro Ala Ser Gln Ala Ala Ala Leu Glu Ala Leu His Ala Tyr Pro  
35 40 45  
Gly Gly Leu Gln Val Gly Gly Gly Ile Asn Leu Gln Asn Ala Met Ser  
50 55 60  
Tyr Leu Ser Cys Arg Lys Lys Asp Gly Arg Tyr Thr Ile Val Thr Asp  
65 70 75 80  
Arg Trp Gln Lys Phe Ser Asp Val Phe Val Asp Glu Pro Ala Leu Gly  
85 90 95  
Tyr Leu Ala Ala Phe Ala Asp Glu Phe Leu Val His Gly Val Asp Val  
100 105 110  
Glu Gly Lys Arg Leu Gly Ile Asp Glu Glu Leu Val Glu Leu Leu Gly  
115 120 125  
His His Ser Pro Ile Pro Val Thr Tyr Ala Gly Gly Val Ser Thr Met  
130 135 140  
Asp Asp Leu Xaa Arg Ile Lys Xaa Ala Xaa Lys Ser Arg Val Xaa Val  
145 150 155 160  
Thr Val Gly Ser Ala Leu Xaa Ile Phe Gly Gly Glu Leu Xaa Tyr Lys  
165 170 175

Glu

<210> 15

<211> 854

<212> DNA

<213> Oryza sativa

<400> 15

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acaaggaaca aaatatggtt agccaacat gatatatcag aggtataatg cttaacctgt 180  
tccatcagct cgattgttat gcacagacct ccagggtcta gaagtaatgc taatgcattt 240  
tctcaagtgt tgtactgca ataattcgat gggctctctg tggataaagt tcaagctgaa 300  
gggttcgatt ttgttcggat ctggaactag gctttacatt gaggactggc cgagctgttt 360  
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agtaaaacat ctcaaagcac catttgcaac ttctcagcag ttcataatgc aagagctgat 780  
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aaaaaaaaaa aaaa 854

<210> 16  
<211> 49  
<212> PRT  
<213> Oryza sativa

<400> 16  
Thr Met Asp Asp Leu Glu Arg Ile Lys Arg Ala Gly Asn Ser Arg Val  
1 5 10 15

Asp Val Thr Val Gly Ser Ala Leu Asp Ile Phe Gly Gly Asp Leu Pro  
20 25 30

Tyr Lys Asp Val Val Leu Trp His Lys Glu Gln Asn Met Val Ser Gln  
35 40 45

Pro

<210> 17  
<211> 487  
<212> DNA  
<213> Glycine max

<220>  
<221> unsure  
<222> (473)

<220>  
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<222> (481)

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tcctgataag tcggctgctg agtatgccgc gctttacaaa caagatggac tcaactggtg 360  
tcatgtcatc atgctcggag ccgacccttt gagcaaaagt tctgcccttg aaagcattac 420  
acgccttata ctggcggggt tggaaagtcg ggggggggaa aaaaatttct gancaanttg 480  
ntttggg 487

<210> 18  
<211> 108  
<212> PRT  
<213> Glycine max

<220>  
<221> UNSURE  
<222> (47)

<220>  
<221> UNSURE  
<222> (59)

<220>  
<221> UNSURE  
<222> (97)..(98)

<400> 18  
Ser Leu Ser Thr Leu Ser Leu His Leu Pro Glu Asp Leu Gln Ala Ser  
1 5 10 15  
Val Gln Cys Ala Val Gln Phe Arg Pro Cys Ile Asp Ile His Lys Gly  
20 25 30  
Lys Val Lys Gln Ile Val Gly Ser Thr Leu Gln Asp Leu Lys Xaa Asp  
35 40 45  
Gly Ser Asp Pro Val Thr Asn Phe Glu Ser Xaa Lys Ser Ala Ala Glu  
50 55 60  
Tyr Ala Ala Leu Tyr Lys Gln Asp Gly Leu Thr Gly Gly His Val Ile  
65 70 75 80  
Met Leu Gly Ala Asp Pro Leu Ser Lys Ala Ser Ala Leu Glu Ser Ile  
85 90 95  
Xaa Xaa Tyr Pro Gly Gly Phe Gly Lys Ser Gly Gly  
100 105

<210> 19  
<211> 981  
<212> DNA  
<213> Glycine max

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gtctcgaaat taccagctgg tcatttcgca aaactctaca aggagaatgg tcttaccggt 300  
gtcatgtca ttatgcttgg acctggaaat gaagaggcag cttaaagaagc cgtaggagag 360  
tggaataatg gtcttcaggt cggaggtggt attacgaatg aaaatgctaa gcaatggatt 420  
gattggggtg ctgagaggta ggtcattatt acttcttttc tatttcccaa tgggaagttc 480  
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gtcgagaaat tggcacaatg gtgtagtatt ccagtcactt atgctggtgg cgggagaaac 780  
cttcaagatc ttgattatgt caagaaactg agtggtggaa aagttgacct tacgattgga 840  
agtgtcttag atgttttcgg aggttctgga gtcacatttg atgaatgtgt acaatggaac 900  
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<210> 20  
<211> 280  
<212> PRT  
<213> Glycine max

<220>  
<221> UNSURE  
<222> (120)

<400> 20

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 Phe Leu Ile Met Thr Lys Phe Arg Pro Cys Ile Asp Leu His Ser Gly  
 20 25 30  
 Gln Val Lys Gln Ile Val Gly Gly Thr Leu Thr Thr Ala Ser Ser Asp  
 35 40 45  
 Leu Lys Thr Asn Tyr Val Ser Lys Leu Pro Ala Gly His Phe Ala Lys  
 50 55 60  
 Leu Tyr Lys Glu Asn Gly Leu Thr Gly Ala His Val Ile Met Leu Gly  
 65 70 75 80  
 Pro Gly Asn Glu Glu Ala Ala Lys Glu Ala Val Gly Glu Trp Lys Asn  
 85 90 95  
 Gly Leu Gln Val Gly Gly Gly Ile Thr Asn Glu Asn Ala Lys Gln Trp  
 100 105 110  
 Ile Asp Trp Gly Ala Glu Arg Xaa Val Ile Ile Thr Ser Phe Leu Phe  
 115 120 125  
 Pro Asn Gly Lys Phe Ser Gln Glu Arg Leu Asp Ser Val Leu Glu Ala  
 130 135 140  
 Leu Gly Gly Asp Lys Glu Lys Leu Val Ile Asp Leu Ser Cys Arg Arg  
 145 150 155 160  
 Arg Asp Asp Thr Trp Phe Val Ala Met Asn Lys Trp Gln Thr Ile Thr  
 165 170 175  
 Asp Met Glu Val Asn Ala Ala Ser Ile Lys Ser Leu Glu Pro Tyr Cys  
 180 185 190  
 Ser Glu Phe Leu Ile His Ala Ala Asp Asn Glu Gly Leu Gln Lys Gly  
 195 200 205  
 Ile Asp Glu Gln Leu Val Glu Lys Leu Ala Gln Trp Cys Ser Ile Pro  
 210 215 220  
 Val Thr Tyr Ala Gly Gly Gly Arg Asn Leu Gln Asp Leu Asp Tyr Val  
 225 230 235 240  
 Lys Lys Leu Ser Gly Gly Lys Val Asp Leu Thr Ile Gly Ser Ala Leu  
 245 250 255  
 Asp Val Phe Gly Gly Ser Gly Val Thr Phe Asp Glu Cys Val Gln Trp  
 260 265 270  
 Asn Gln Arg Gln Val Ala Ser Ser  
 275 280

<210> 21  
 <211> 1210  
 <212> DNA  
 <213> Triticum aestivum

<400> 21

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ttgggcgagc tcgcgggtct cggcacgccc ggcgcaatcc ggcgcgtcaa gagggcgtgc 180
cgtcgtgtgc gccgtcagct tcaggccatg tatcgacatt cacaagggga aagttaaaca 240
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          20          25          30
Pro Cys Ala Ala Pro His His Gly Trp Ala Ser Ser Arg Val Ser Ala
          35          40          45
Arg Pro Ala Gln Ser Gly Ala Ser Arg Gly Arg Ala Val Val Cys Ala
          50          55          60
Val Ser Phe Arg Pro Cys Ile Asp Ile His Lys Gly Lys Val Lys Gln
          65          70          75          80
Ile Val Gly Ser Thr Leu Arg Asp Ala Ser Asp Asp Gly Thr Ala Leu
          85          90          95
Val Thr Asn Phe Glu Ser Asp Lys Ser Pro Ala Glu Phe Ala Asn Ile
          100          105          110
Tyr Lys Glu Asp Gly Leu Val Gly Gly His Val Ile Met Leu Gly Gly
          115          120          125
Asp Pro Ala Ser Arg Ser Ala Ala Leu Glu Ala Leu His Ala Tyr Pro
          130          135          140
Gly Gly Leu Gln Val Gly Gly Gly Ile Asn Leu Glu Asn Ala Met Ser
          145          150          155          160
Tyr Leu Asn Glu Gly Ala Ser His Val Ile Val Thr Ser Tyr Val Phe
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 Gly Arg Tyr Ala Ile Val Thr Asp Arg Trp Gln Lys Phe Ser Asp Val  
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 Phe Val Asp Gly Pro Thr Leu Glu Arg Leu Ala Ala Tyr Ala Asp Glu  
 225 230 235 240  
 Phe Leu Val His Gly Val Asp Val Glu Gly Lys Arg Leu Gly Ile Asp  
 245 250 255  
 Glu Glu Leu Val Glu Leu Leu Gly Ser His Ser Pro Ile Pro Thr Thr  
 260 265 270  
 Tyr Ala Gly Gly Val Ser Thr Met Asp Asp Leu Glu Arg Ile Lys Lys  
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 Ala Gly Lys Ser Arg Val Asp Val Thr Val Gly Ser Ala Leu Asp Ile  
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 Phe Gly Gly Asp Leu Pro Tyr Asp Asp Val Val Arg Trp His Lys Glu  
 305 310 315 320  
 Gln Asn Leu Val Ser Lys Arg  
 325